INSTRUCTIONS

Warmup®

The world's best-selling electric floor heating brand

Type ETO2 Controller for ice and snow melting

English

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GREEN COMFORT
Maximum comfort with low energy consumption

Type ETO2 is an electronic controller for fully automatic, economical ice and snow melting on outdoor areas and in gutters. Ice forms due to a combination of low temperature and moisture. ETO2 detects both temperature and moisture, and the snow melting system will usually only be activated if snow or ice is present. ETO2 is suitable for controlling electric heating cables, or water-based heating pipes.

Product program

ETO2-4550-xxxx	Thermostat.
ETOG-55-xxxxx	Ground sensor for detecting temperature and moisture.
ETOR-55-xxxxx	Gutter sensor for detecting moisture.
ETF-744/99	Outdoor sensor for detecting temperature

WARNING! – Read this manual!
Carefully read this instruction manual in its entirety, paying close attention to all warnings listed below. Make sure that you fully understand the use, displays and limitations of the controller, because any confusion resulting from neglecting to follow this instruction manual, or from improper use of this device, may cause an installer to commit errors, that may lead to ice & snow conditions resulting in serious injury or death.

WARNING! – Be aware that snow, ice and iceicles may be present even if you follow the instruction or manual.
You are strongly advised to follow any unexpected build-up of snow, ice layers or icicles. As an additional safety measure, you should always perform a manual inspection of public areas in order to secure safety for access of the controlled areas.

WARNING! – Important safety instructions.
Disconnect the power supply before carrying out any installation or maintenance work on this control unit and associated components. This control unit and associated components should only be installed by a competent person (i.e. a qualified electrician). Electrical installation must be in accordance with appropriate statutory regulations.

CE MARKING, FOR EU
OJ Electronics A/S hereby declares that the product is manufactured in accordance with Council Directive

2004/108/EC on electromagnetic compatibility (and subsequent amendments) and Council Directive 2006/95/EEC on electrical equipment designed for use within certain voltage limits.

Applied standards

ETO2-4550-EU28: CE marking LVD/EMC: EN60730-2-9
ETO2-4550-US28: CAN/CSA E 60730-2-9:01.
ETO2-4550-RU28: CE marking LVD/EMC: EN60730-2-9

The product may only be used if the complete installation complies with current directives.
The product carries a manufacturer's warranty if installed in accordance with these instructions and current regulations.
If the product has been damaged in any way, e.g. during transport, it must be inspected and checked by authorised personnel before being connected to the power supply.

Technical data
Thermostat ETO2-4550:
Designed to be mounted indoor only!
Supply voltage . . . . . .115/240V AC ±10%, 50-60 Hz
Built-in electronic power supply (SMPS) . . .24 V DC, 8 VA
3 output relays (potential-free contact, NO) . . . . .3 X 16 A
Alarm relay (potential-free contact, NO) . . . . . .max. 5 A
Control signal to actuator (mixing valve) . . . . . .0-10 V DC
Supply voltage to actuator
(mixing valve) . . . . . .24 V AC / 100 mA
On/off differential . . . . . .1.8°F / 1°C
Temperature range . . . . . .-4/+50°F / -20/+10°C
Ambient temperature . . . . . .32/122°F / 0/+50°C
Ambient air humidity 10-95%
Enclosure rating . . . . . .IP 20 / Nema 1
Weight . . . . . .600 g
Dimensions H/W/D . . . . . .90/156/45 mm

Type 1B
Control pollution degree 2
Rated impulse voltage . . . . . .4 kV

Ground sensor type ETOG-55:
Designed to be embedded in outdoor areas.
Detection . . . . . .Moisture and temperature
Mounting . . . . . .Outdoor area
Enclosure rating . . . . . .IP 68
Ambient temperature . . . . . .-57/+158°F / -50/+70°C
Dimensions . . . . . .H32, Ø60 mm

Gutter sensor type ETOR-55:
Designed to be mounted in gutter or downpipe. Is used together with outdoor sensor type ETF.
Detection . . . . . .Moisture
Mounting . . . . . .Gutter or downpipe
Enclosure rating . . . . . .IP 68
Ambient temperature . . . . . .-57/+158°F / -50/+70°C
Dimensions H/W/D . . . . . .105/30/13 mm

Outdoor sensor type ETF-744/99:
Detection . . . . . .Temperature
Mounting . . . . . .Wall
Ambient temperature . . . . . .-57/+158°F / -50/+70°C
Dimensions H/W/D . . . . . .86/45/35 mm

Water sensor type ETF-1899A:
Detection . . . . . .Temperature
Mounting . . . . . .Strap on pipe
Ambient temperature . . . . . .-4/+158°F / -20/+70°C
Dimensions H/W/D . . . . . .86/45/35 mm
The snow and ice melting system is deactivated in the event of sensor failure.

SENSOR INSTALLATION

Ground sensor ETOG, fig. 1+3:
For installation on outdoor areas where snow and ice is a regular problem. The sensor must be embedded horizontally with its top flush with the surroundings. Use the accompanying installation plate.
The sensor cable must be installed in accordance with current regulations. We recommend that cable pipes be laid to protect the sensor cable. Detailed installation instructions are supplied with the sensor.

Gutter sensor ETOR, fig. 2+4:
For installation in a gutter, or downpipe on the sunny side of the building. It is important to ensure that the sensor contact elements face against the flow of melt water. If necessary, two sensors can be installed in parallel. Detailed installation instructions are supplied with the sensor.

Note that the pink and grey wires are not used.

Outdoor sensor ETF-744/99, fig. 2+4:
ETF is for use with gutter sensor ETOR. ETF can also be used separately for the detection of temperature alone. The sensor should be mounted on the wall beneath the eaves on the north side of the building.

Water sensor type ETF-1899A:
Only for use in waterbased system to detect temperature in supply and return water. Must be fastened with strips fixed directly on the pipe.

Sensor cables:
ETOG and ETOR are supplied with 10 m cable, which can be extended up to approx. 200 m using standard installation cable: 6x1.5 mm^2 for ETOG and 4x1.5 mm^2 for ETOR. The ETF cable can be up to approx. 50 m in length. Sensor cables must be installed in accordance with current regulations. They must never be installed parallel to power cables as electrical interference may distort the sensor signal.

ETO2 installation
The unit is intended to be DIN-rail mounted in an approved panel.
Wall mounting:
For USA and Canada: The thermostat can be wall-mounted in a specially designed and UL-approved metal box (accessory).
For other countries: The accompanying plastic cover can be used for wall mounting in an indoor area.
Connect supply voltage to terminals N and L. All electrical and mechanical installation must be performed in accordance with applicable local regulations.

Setup:

- **1-zone electric heating control with ETOG (fig. 3+6):**
  Connect 1 or 2 ETOG sensors to terminals 11-20.
  Connect heating cable to output relays 1, 2 and 3 according to fig. 8.

- **1-zone electric heating control with ETOR + ETF (fig. 4+7):**
  Connect 1 or 2 ETOR sensors to terminals 11-20. Note that the pink and grey wires are not used.
  Connect 1 ETF sensor to terminals 31-32.
  Connect heating cable to output relays 1, 2 and 3 according to fig. 8.

- **2-zone electric heating control with ETOG (fig. 6):**
  Connect 2 ETOG sensors to terminals 11-20.
  Connect heating cable for zone 1 to output relay 1 according to fig. 8.
  Connect heating cable for zone 2 to output relay 2 according to fig. 8.

- **2-zone electric heating control with ETOR (fig. 7):**
  Connect 2 ETOR sensors to terminals 11-20. Note that the pink and grey wires are not used.
  Connect heating cable for zone 1 to output relay 1 according to fig. 8.
  Connect heating cable for zone 2 to output relay 2 according to fig. 8.

- **2-zone electric heating control with ETOR and ETOG (fig. 5+6+7):**
  Connect 1 ETOR sensor to terminals 11-16 as sensor 1. Note that the pink and grey wires are not used.
  Connect 1 ETOG sensor to terminals 11-20 as sensor 2. Connect heating cable for zone 1 (roof) to output relay 1 according to fig. 8.
  Connect heating cable for zone 2 (ground) to output relay 2 according to fig. 8.

- **1-zone electric heating control and output control (Y/Δ) (fig. 9+10):**
  Advanced 2-step control with ETOG-55. 1/3 power on heating cables in afterrun.
  Connect 1 or 2 ETOG sensors to terminals 11-20.
  Connect external contactor/relays to output relays 1, 2 and 3 according to fig. 10.

- **1-zone hydronic heating control for control of supply water temp. with mixing valve (fig. 6+11):**
  Connect 1 or 2 ETOG sensor to terminals 11-16.
  Connect supply voltage (24 V AC) for mixing valve to terminals 25-26 (fig. 13)
  Connect mixing valve to terminals 21-24 (fig. 13).
  Connect ETF 1899A supply and return sensors to terminals 27-30.
  Connect primary pump to output relay 1 according to fig. 14.
  Connect secondary pump to output relay 2 according to fig. 14.

- **1/2-zone hydronic heating control, simple (fig. 6+12):**
  Connect 1 or 2 ETOG sensors to terminals 11-20.
  Connect circulation pump for zone 1 to output relay 1 according to fig. 14.
  If zone 2 is used, connect circulation pump for zone 2 to output relay 2 according to fig. 14.
  Application setup as for 1/2-zone electric heating control, see User Manual, Startup.

- **Remote control (fig. 15):**
  The forced heat and standby functions can be remotely controlled by wiring ETO2 to external buttons/relays (normally open).
  Connect external standby button to terminals 33-34.
  Connect external forced heat button to terminals 35-36.

TESTING SNOW MELTING SYSTEM

After completing installation and application setup, it is recommended that the snow melting system be tested.

1. Adjust SET TEMP in the setup menu to max. temperature.
2. Pour some water onto the sensor (ETOG/ETOR).
3. The output relay for the heating cable in the zone concerned should activate and ON should be indicated on the ETO2 display. Check that the heating cable becomes warm, check the voltage if possible.
4. After testing, adjust SET TEMP back to the desired setting (factory setting = +3.0°C / 37.4°F).

WIRING

Terminal	Colour code	Wiring
N, L		Supply voltage, 120-240 V AC 50/60 Hz
1, 2		Alarm relay (potential free) max. 5 A
3, 4		Output relay 1, 16 A (potential free), Heating cable 1 (zone 1) / Primary pump
5, 6		Output relay 2, 16 A (potential free), Heating cable 2 (zone 2) / Secondary pump
7, 8		Output relay 3, 16 A (potential free), Heating cable 3
11, 12	brown/green	Sensor heating 1+2, ETOG 1+2 and ETOR 1+2
13, 14	grey/pink	Temperature sensor, ETOG 1
15, 16	yellow/white	Moisture sensor 1, ETOG 1/ ETOR 1
17, 18	grey/pink	Temperature sensor, ETOG 2
19, 20	yellow/white	Moisture sensor, ETOG 2 / ETOR 2
21, 22		3/4-way mixing valve, 0-10 V
23, 24		3/4-way mixing valve, 24 V AC
25, 26		24 V AC from external supply, for 3/4-way mixing valve

ETOR SENSOR WIRES : Note that the pink and grey wires are not used.

Terminal	Colour code	Wiring
27, 28		Supply water temperature sensor, ETF-1899A
29, 30		Return water temperature sensor, ETF-1899A
31, 32		Outdoor temperature sensor, ETF
33, 34		Standby, external input
35, 36		Forced control heat, external input

Environment protection and recycling
Help protect the environment by disposing of the packaging and redundant products in a responsible manner.

Product disposal
Products marked with this symbol must not be disposed of along with household refuse, but must be delivered to a waste collection centre in accordance with current local regulations.

Figures

Fig. 1 Installation of ETOG ground sensor
1 Sensor
2 Installation plate
3 Heating element
Fig. 2 Installation of ETOR gutter sensor and ETF outdoor sensor
1 Thermostat ETO2
2 Gutter sensor
3 Outdoor sensor
Fig. 3 One-zone electric heating with ETOG sensor
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Fig. 9 Two-stage electric heating control (Y/Δ)
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Fig. 14 Hydronic pump connection
Fig. 15 Connections for remote control of standby and forced heat
Fig. 16 ETO2 controller, terminal overview

Fig. 1 *ETOG-55 Installation*

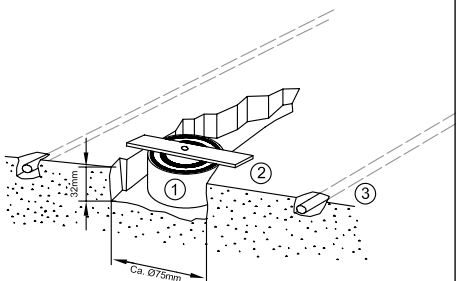

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Fig. 2 *ETOR-55 Installation*

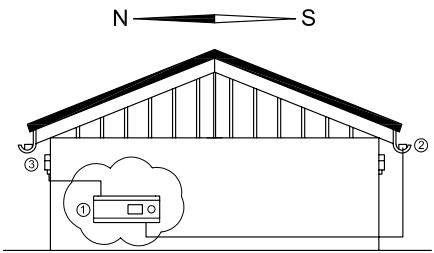

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Fig. 3 Electric 1-zone with ETOG-55 sensor

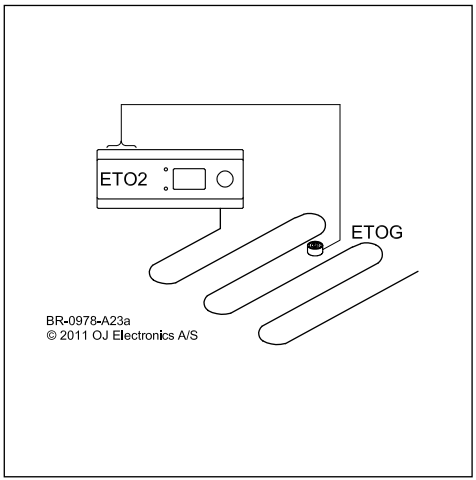


Fig. 4 Electric 1-zone with ETOR-55 / ETF

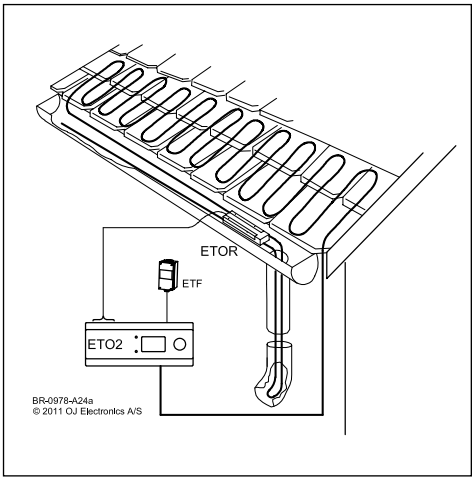


Fig. 5 *Electric 2-zone with ETOG, ETOR and ETF*

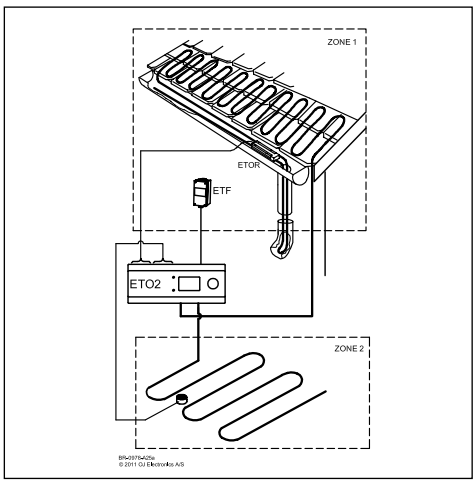


Fig. 6 *ETOG-55 connections*

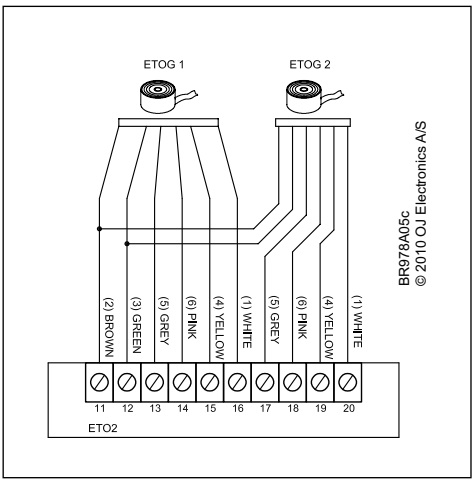


Fig. 7 ETOR-55 connections

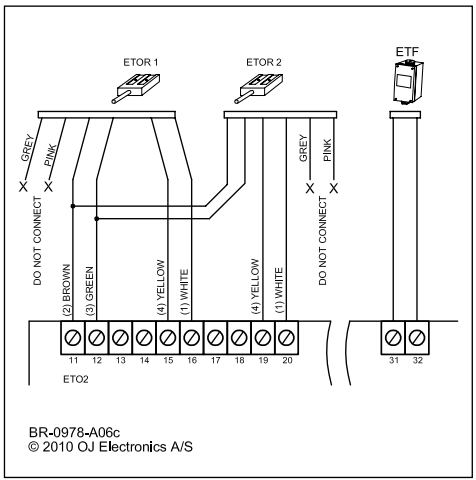


Fig. 8 Electric heating cable connections

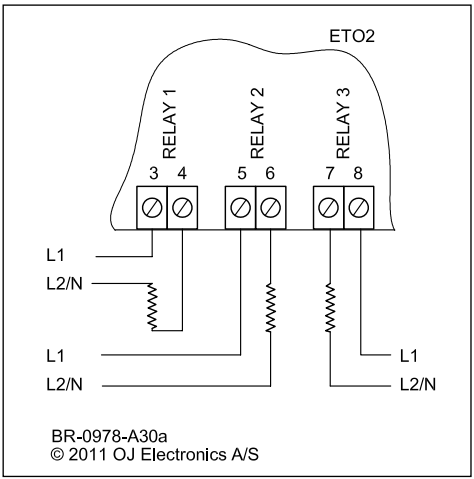


Fig. 9 *Advanced 2-step with ETOG-55. 1/3 power on heating cables in afterrun.*

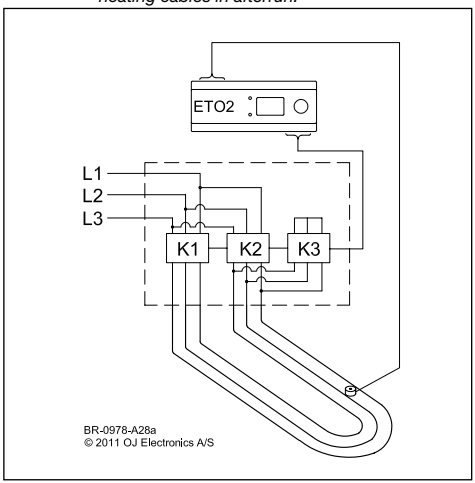


Fig. 10 *Advanced 2-step connections. 1/3 power on heating cables in afterrun.*

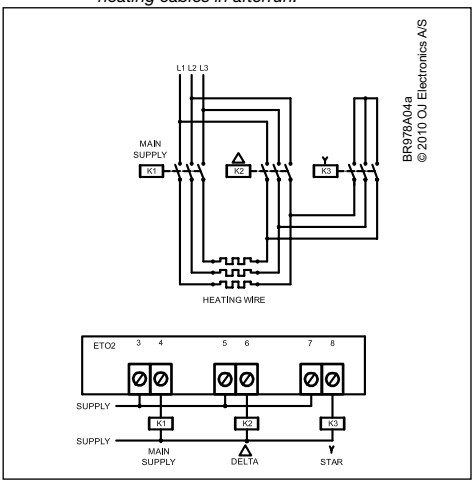


Fig. 11 Hydronic heating with mixing valve

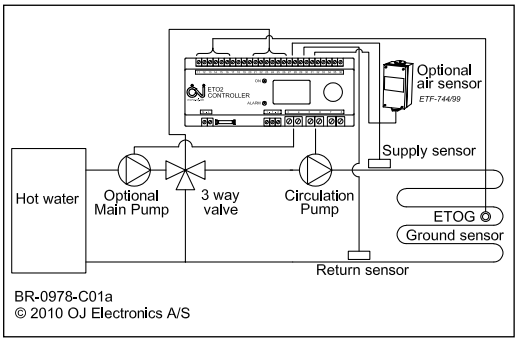


Fig. 12 Hydronic, simple application

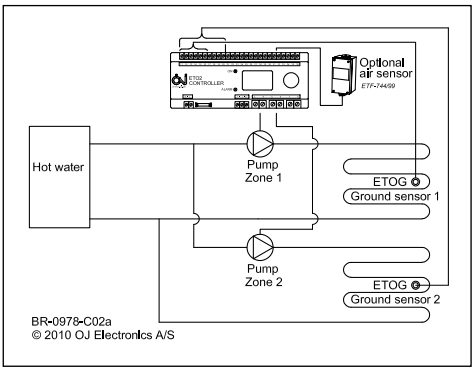


Fig. 13 Hydronic mixing valve connection

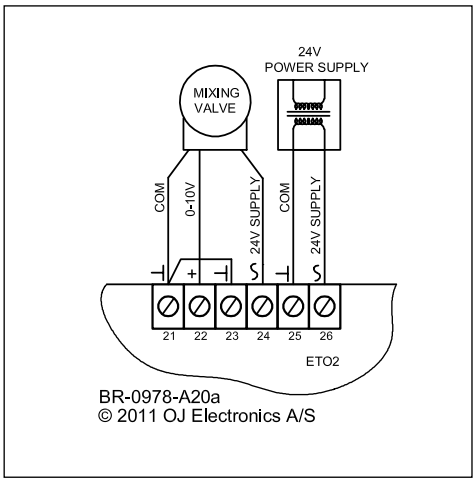


Fig. 14 Hydronic pump connection

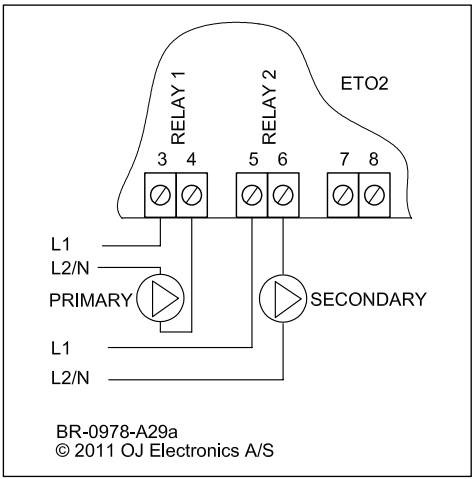


Fig. 15 Connection of Stand by & forced heat

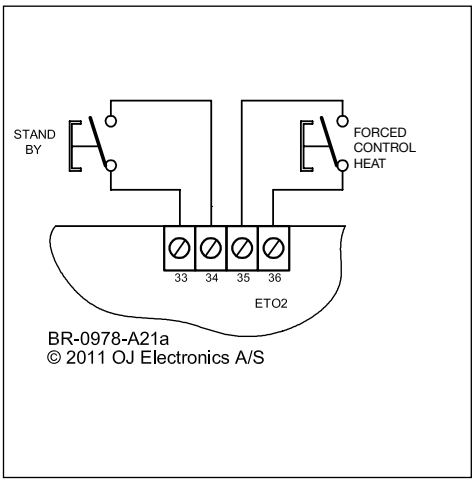
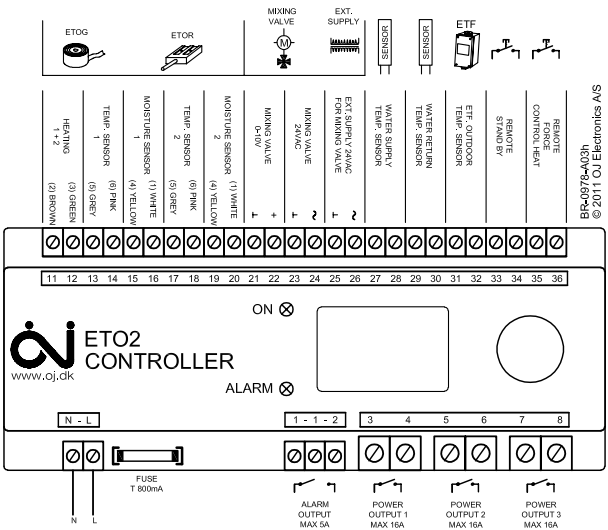


Fig. 16


ETOG
ETOR
MIXING VALVE
EXT. SUPPLY
SENSOR
SENSOR
ETF
HEATING 1+2
TEMP. SENSOR 1
MOISTURE SENSOR 1
TEMP. SENSOR 2
MOISTURE SENSOR 2
MIXING VALVE 0-10V
MIXING VALVE 24VAC
EXT. SUPPLY 24VAC FOR MIXING VALVE
WATER SUPPLY TEMP. SENSOR
WATER RETURN TEMP. SENSOR
ETF. OUTDOOR TEMP. SENSOR
REMOTE STAND BY
REMOTE FORCE CONTROL HEAT
(2) BROWN
(3) GREEN
(6) PINK
(5) GREY
(1) WHITE
(4) YELLOW
11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
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CONTROLLER
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N
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POWER OUTPUT 2 MAX 16A
ZONE 2
POWER OUTPUT 3 MAX 16A
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